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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/540,436

11/10/2005

Dirk Nuber

4791-4011

1654

7278

7590

04/17/2009

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EXAMINER

WILSON, GREGORY A

ART UNIT

PAPER NUMBER

3749

MAIL DATE

DELIVERY MODE

04/17/2009

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/540,436	<b>Applicant(s)</b> NUBER ET AL.	
	<b>Examiner</b> Gregory A. Wilson	<b>Art Unit</b> 3749	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 January 2009.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-7,9-13 and 23 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-13 and 23 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Claim Objections*

Claim 1 objected to because of the following informalities:

In line 7, change "though" to –through--.

Appropriate correction is required.

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

**Claims 1-4, 6, 7, 9, 10 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Barnes (4,795,547)**. **Barnes** discloses a process for fluidizing particles in a solids container (ie: fluidized bed reactor) in which fine-grained solids are introduced and heated in a temperature environment of between 450-550 degrees C (SEE column 1, lines 55-60) wherein gas from a fluid supply means (1) (such as steam or sour field catalytic cracking off gas) is mixed with the fluid from centrally placed tubular inlet (5) from below and flows into mixing zone (19) located above an annular stationary fluidized bed (23), the gas flowing through tube (1) is capable of entraining any solids which may be present through the gap opening (17) from the stationary annular fluidized bed (23) that partly surrounds the tube. A supply of fluidized gas by

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way of lances (24) introduce the gas cooling medium from gas inlet (22) at a pressure of 2-6 bars (column 1, line 62). The solids entrained can be conveyed out of the reactor by adjusting the velocity of the gas mixture (SEE column 2, line 37-43). Barnes does not particular disclose the entrainment of solids in gas based off the particle Froude number in the gas supply tube, annular fluidized bed nor mixing chamber, however does teach that the velocities of the gases can be adjusted. It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains to have modified the velocities of the gas flow of Barnes based on calculated Froude numbers in the gas supply tube since such determination would involve only routine skill in the art and "it is not inventive to discover the optimum or workable ranges by routine experimentation." (quoting *In re Aller*, 220 F.2d 454, 456, 105 USPQ 233, 235 (CCPA 1995)).

### ***Claim Rejections - 35 USC § 103***

**Claims 1-6, 9-11 and 23** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hirsch (4,789,580) in view of Hiltunen et al (5,505,907)**. Hirsch discloses a method for the heat treatment of fine-grained solids (common knowledge in the art to have a grain size of less than 2mm in re claim 6) that are heated/calcined to a temperature of 800 degrees C to 1100 degrees C in a stationary fluidized bed while being supplied with carbonaceous reducing agents and oxygen containing gases (SEE column 2, lines 5-17) such as air (in re claim 9), being used as the fluidizing gas. In column 3, lines 20-49, it is disclosed that the conditions of the fluidized bed reactor are

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defined by the particle Froude and Archimedes numbers. Hirsch does not particularly teach a central gas supply tube wherein the gas flowing through the gas supply tube entrains solids from the fluidized bed into the mixing chamber when passing through the upper orifice region of the gas supply tube. Hirsch teaches an apparatus for treating or utilizing a hot gas flow and includes a reactor (10) with an annular chamber (12) provided with a fluidized bed (14). A centrally placed gas supply tube (16) (operating in a low pressure embodiment, wherein 0.8 to 10 bar constitute a low pressure embodiment in re claim 10) which is surrounded by the stationary fluidized bed and top edge (ie: upper orifice end) is even with the top surface of the fluidized bed (See column 4, lines 1-6), the upper surface of the fluidized bed (14) may be arranged and maintained above the level of the edge (18) (SEE column 6, lines 17-40) so that the particles overflow (50) and are entrained in the hot gas supply with the benefit being the reduction of fouling components and diminishing the clogging tendency of the gas supply tube (16). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains to have modified the method of Hirsch by utilizing a fluidized bed with a centrally located gas supply tube and entrainment system of Hiltunen for the purpose of reducing fouling components and reducing the possibility of clogging of the gas supply tube. With regards to claims 2-4, Hirsch discloses that the operating conditions of the fluidized bed reactors are defined by the particle Froude and Archimedes numbers (as stated above) however does not give a specific range for the Froude numbers in the gas supply tube, annular fluidized bed nor mixing chamber, however, it would have been obvious to one

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having ordinary skill in the art at the time the invention was made to choose the claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. With regards to claim 5, Hiltunen teaches that the upper surface of the fluidized bed (14) may be arranged at a higher level than the top level of the supply duct (16) and its edges (18) such that particles overflow (50) and are entrained in the hot gases (SEE column 6, lines 17-40). With regards to claim 11, Hirsch teaches that the solids may be dried and pre-heated using waste heat from a calcining step before they are calcined in a stage which includes a heat exchanger and a downstream separator (16) SEE Figure 1.

**Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over **Hirsch (4,789,580) in view of Hiltunen (5,505,907) and further in view of Rammler (3,884,620)**. Hirsch in view of Hiltunen discloses the applicants primary inventive concept as stated above including a method of heat treating fine grained particles but does not particularly teach that a combustion chamber upstream of the fluidized bed reactor is fed with fuel and exhaust gas, however, it is taught in Hiltunen that hot gas (48) is introduced through an inlet duct (16) but does not disclose the source of the hot gas. Rammler teaches a process and apparatus for continuously heating fine grained particles wherein provided upstream of the reactor is a combustion chamber (12) having supply conduits for fuel and oxygen (SEE column 5, lines 14-21) and operated with a gas-air ratio which is exactly controlled to ensure that the combustion gases contain

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only traces of free oxygen which is beneficial because the caking of the particulate material could substantially be reduced by oxidation, the exhaust gas is recirculated back to the reactor via a supply conduit . It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains to have modified Hirsch in view of Hiltunen by adding the combustion chamber teaching of Rammler as a source for providing hot gas flow to be utilized in the Hiltunen reactor since Hiltunen has a high heating requirement.

**Claims 12 and 13** are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hirsch (4,789,580) in view of Hiltunen (5,505,907) and further in view of Schmidt (6,015,539)**. Hirsch in view of Hiltunen discloses the applicants primary inventive concept as stated above, including a method of heat treating fine grained particles wherein in Hirsch the reduced material is discharged via conduit (31) however neither reference teaches but does not particularly teach where the reduced material travels after it is processed. Schmidt teaches that it is known in the art for a product, that is received from a reactor after having been processed, to be supplied to a cooling system (SEE column 4, lines 22-43), which comprises a number of cooling stages connected one after another (SEE the suspension coolers 16, 18, 20 of Figure 1) as well as a fluidized bed cooler (23). It would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains to have incorporated a cooling system such as that taught by Schmidt as an end arrangement to the combination of Hirsch as modified by Hiltunen for the purpose

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of reducing the temperature of the high temperature product into a more manageable form.

### ***Response to Arguments***

Applicant's arguments filed 1/22/09 have been fully considered but they are not persuasive. With regards to Barnes (4,795,547) the applicant states that he has amended claim 1 to include the previously indicated allowable subject matter of claim 5, however, it is noted by the Examiner that the subject matter of the now cancelled claim 5 included the language "wherein the bed height of the solids in the reactor is adjusted such that the annular fluidized bed extends beyond the upper orifice end of the gas supply tube, and wherein solids are constantly introduced into the first gas or gas mixture and entrained by the gas stream to the mixing chamber located above the orifice region of the gas supply tube". Such language has not be incorporated into the newly submitted claim 1 dated 1/22/09. The structure of Barnes remains obvious over the applicants invention and applicants arguments as it pertains to Barnes are moot.

### ***Conclusion***

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).



A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory A. Wilson whose telephone number is (571)272-4882. The examiner can normally be reached on 7 am - 4:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Steve McAllister can be reached on (571) 272-6785. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Gregory A. Wilson/  
Primary Examiner, Art Unit 3749  
April 16, 2009